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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/627,573	07/28/2000	Haixiang Liang	1005-0013	2339

22120 7590 04/21/2005

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EXAMINER

ODOM, CURTIS B

ART UNIT	PAPER NUMBER
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2634

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary**Application No.**

09/627,573

Applicant(s)

LIANG, HAIXIANG

Examiner

Curtis B. Odom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/2/2004 have been fully considered but they are not persuasive. Amended claims 1-9, 26, and 30 are still directed to non-statutory subject matter. The claims are directed toward an impairment compensations sequence which is simply a signal. Even though the signal "may be employed to conform a communications device to at least a subset of impairments that may be present in a communications channel and may be used to estimate the received amplitudes associated with all possible ucodes that could be transmitted by a remote modem", it is the communication device, not the impairment compensation sequence, which performs the functions of the detection and estimation. Thus, the impairment compensation sequence alone does not perform any functions and falls into the category Nonfunctional Descriptive Material (See MPEP § 2106 IV.B.1. (b)).

Applicant also states that Zhang et al. (U. S. Patent No. 6, 721, 279) fails to disclose "a sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases". However, it is understanding of the examiner that Zhang et al. in fact does disclose this limitation. Zhang et al. discloses that sample magnitudes of a training sequence (digital impairment learning sequence) are estimated to detect impairments such as robbed bit signaling (RBS). RBS is detected by estimating the sample magnitude level (PCM level) of the training sequence, such that an RBS-affected codeword may be received as if it were one level less than

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the transmitted level (column 5, lines 13-44 and column 6, lines 29-44). RBS is periodic in nature and based on a period of six symbols, wherein the six symbols correspond to a phase of RBS (column 5, lines 35-43). Zhang et al. further discloses the training sequence corresponds to the phases of RBS (column 5, line 12-column 6, line 67, wherein training sequences are sent on a group of M samples, wherein M is a multiple of six) and placing training symbols (B_i^1) in each of the phases of the training sequence to detect RBS (column 6, lines 29-65, column 9, lines 5-48, and column 10, lines 29-67). In particular, Zhang et al. states “a value B_i^1 may be place sparsely in the sequence (training sequence) as shown to estimate each of the six phases” (column 8, lines 43-46). Zhang et al. also discloses a training sequence in which B_i^1 is placed for times in each RBS frame (phase) to detect RBS (column 10, lines 29-67). B_i^1 is a training symbol which comprises of a set of Ucodes wherein each Ucode specifies the training symbol for each phase of the impairment compensation sequence (column 6, lines 3-6).

Thus, on the basis of the arguments presented above, it is the understanding of the examiner that Zhang et al. discloses “a sequence (training sequence) organized to place at least one instance (B_i^1) of each symbol from a predetermined set of symbols (Ucodes) in each phase (RBS frame/phase) to allow detection (estimation of sample/PCM levels) of the potential impairments (RBS) in each of the N phases”.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

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3. Claims 1-9, and 26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 1-9 are directed towards the characteristics of a signal. Note this signal merely consists of "1" and "0" to represent the coded signal. The signal falls into the category of Nonfunctional Descriptive Material. See for example MPEP § 2106

IV.B.1. (b) which states that

The policy that precludes the patenting of nonfunctional descriptive material would be easily frustrated if the same descriptive material could be patented when claimed as an article of manufacture. For example, music is commonly sold to consumers in the format of a compact disc. In such cases, the known compact disc acts as nothing more than a carrier for nonfunctional descriptive material. The purely nonfunctional descriptive material cannot alone provide the practical application for the manufacture.

The signal is functionally equivalent to the compact disc in that it is nothing more than a carrier for nonfunctional descriptive material (1's and 0's). The nonfunctional material, or the signal for that fact, cannot alone provide the practical application for the manufacture. Without a communications device, the signal is nonfunctional, it produces or manufactures nothing. Thus, a claim directed toward a signal is deemed non-statutory subject matter.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 10-16 and 18-25, and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al. (previously cited in Office Action 5/5/2004).

Regarding claim 10, Zhang et al. discloses a communication system susceptible to one or more potential impairments (Fig. 1) each periodic in an integer number of symbols transmitted across a communications channel (column 5, lines 13-44), the communication system comprising:

a receiver (Figs. 3-6) to receive an impairment compensation sequence, the impairment compensation sequence including:

N phases (column 5, lines 13-44, column 5, lines 5-48, and column 10, lines 29-67), wherein N is selected such that each potential impairment, if present, is periodic therein, wherein the DIL sequences contain six phases or frames representative of the phases the potential impairment (column 10, lines 42-67);

a sequence of symbols (column 5, lines 5-48 and column 10, lines 29-67, training sequences), the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, wherein B_i^1 is an instance of each symbol from a predetermined set of symbols (column 6, lines 29-65, column 9, lines 5-48, and column 10, lines 29-67) in each phase of the training sequences (column 9, lines 17-30 and column 10, lines 45-65) to allow detection of the potential impairments (RBS); B_i^1 representing magnitude/PCM level estimates used to calculate the presence of potential impairment (column 5, lines 13-44 and column 9, lines 40-55); and

an equalizer (Fig. 4, column 5, lines 24-34 and column 6, lines 29-44) to equalize the impairment compensation sequence, the equalizer producing amplitude estimates of the sequence of symbols, wherein the magnitude estimates are representative of amplitude estimates of the sequence of symbols.

Regarding claim 11, which inherits the limitations of claim 10, Zhang et al. discloses the sequence includes a number of segments, the number corresponding to a number of elements in the predetermined set of symbols (column 5, line 13-column 6, line 44, column 9, lines 17-30, and column 10, lines 45-65).

Regarding claim 12, which inherits the limitations of claim 10, Zhang et al. discloses the potential impairments include at least one of RBS, padding, and a combination of RBS and padding (column 5, lines 13-44).

Regarding claim 13, which inherits the limitations of claim 10, Zhang et al. disclose the predetermined set of symbols includes at least a subset of a universal PCM codeword set (column 6, lines 3-67).

Regarding claim 14, which inherits the limitations of claim 10, Zhang et al. discloses the N phases could include 24 time phases (column 5, lines 13-24, column 6, lines 29-44 and column 10, lines 29-67), wherein M represents the number of phases.

Regarding claim 15, which inherits the limitations of claim 10, Zhang et al. discloses N is at least a common multiple of respective periods of each of the potential impairments (column 5, lines 13-24, column 6, lines 29-44 and column 9, lines 13-48), wherein M is a common multiple of respective periods of each of the potential impairments.

Regarding claim 16, which inherits the limitations of claim 10, Zhang et al. discloses the sequence is organized to place at least two instances of the symbol from the predetermined set of symbols in each phase, an average of received values corresponding to the at least two instances improving an estimation of the symbol, wherein at least two instances of B_i^1 are placed in each phase of the DIL sequences (column 9, lines 17-30 and column 10, lines 45-64).

Regarding claim 18, the claimed method includes features corresponding to subject matter mentioned above in the rejection of claim 1 which is applicable hereto.

Regarding claim 19, which inherits the limitations of claim 19, Zhang et al. discloses the channel includes a digital portion of a PSTN and wherein the potential impairments include at least one of RBS, padding, and a combination of RBS and padding in the digital portion of the PSTN (Fig. 1, column 1, line 20-column 2, line 53).

Regarding claim 20, which inherits the limitations of claim 18, Zhang et al. discloses the sequence of symbols is a DIL sequence (column 6, lines 51-66 and column 9, lines 14-30).

Regarding claims 21-24, the claimed method includes features corresponding to subject matter mentioned above in the rejection of claims 11, 13, 15 and 16 which is applicable hereto.

Regarding claim 25, which inherits the limitation of claim 24, Zhang et al. discloses the subset is selected in accordance with power constraints (column 6, lines 10-17).

Regarding claim 27, which inherits the limitations of claim 18, Zhang et al. discloses the sequence of symbols is compatible with a plurality of equalizers (Figs. 3-6), the plurality of equalizers including partial response type equalizer structures (column 4, lines 27-48 and column 6, lines 29-44).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (previously cited in Office Action 5/5/2004).

Regarding claim 17, Zhang et al. discloses a receiver (Figs. 3-6) for receiving data over a communications channel susceptible to one or more potential impairments each periodic in an integer number of symbols transmitted across a communications channel (column 5, lines 13-44), the receiver comprising:

a device to receive an impairment compensation sequence including:

N phases (column 5, lines 13-44, column 5, lines 5-48, and column 10, lines 29-67), wherein N is selected such that each potential impairment, if present, is periodic therein, wherein the DIL sequences contain six phases or frames representative of the phases the potential impairment (column 10, lines 42-67);

a sequence of amplitudes transmitted from terminal equipment (column 5, lines 5-48 and column 10, lines 29-67, training sequences), the sequence organized to place at least one instance of each symbol from a predetermined set of symbols in each phase to allow detection of the potential impairments in each of the N phases, wherein B_i^1 is an instance of each symbol from a predetermined set of symbols (column 6, lines 29-65, column 9, lines 5-48, and column 10, lines

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29-67) in each phase of the training sequences (column 9, lines 17-30 and column 10, lines 45-65) to allow detection of the potential impairments; B_i^l representing magnitude/PCM level estimates (amplitudes level estimates) used to calculate the presence of potential impairment (column 5, lines 13-44 and column 9, lines 40-55); and

a decoder (Fig. 3, block 304) for decoding the sequence of amplitudes.

Zhang et al. does not disclose a demodulator for demodulating a modulated impairment compensation sequence. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the demapper (Fig. 3, block 308) of Zhang et al. could have been considered a demodulator since its demaps symbols mapped at the transmitter to recover an original bit stream (column 5, lines 4-11). Thus, the demapper of Zhang et al. can be considered a functional equivalent of the demodulator of the present application; therefore, claims 17 does not constitute patentability.

8. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang et al. (previously cited in Office Action 5/5/2004) in view of Langberg et al. (previously cited in Office Action 5/5/2004).

Regarding claims 28, Zhang et al. discloses all of the subject matter as described in the previous rejection (see rejection of claim 10), except for the method executed by the device written as a computer program product with a computer readable storage medium.

However, Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer readable medium is an electronic, magnetic, optical, or other physical device or means that can contain or store a computer program for use by or in

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connection with a computer-related system or method (note column 3, lines 51-65). One skilled in the art at the time the invention was made would have clearly recognized that the method of Zhang et al. would have been implemented into software. The implemented software would perform the same function of the hardware for less expense, greater adaptability, and greater flexibility. Therefore, it would have been obvious to have used the software in Zhang et al. as taught by Langberg et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

Regarding claim 29, which inherits the limitations of claim 28, Zhang et al. further discloses the data is encoded by or transmitted in at least one computer readable medium selected from the set of a disk, tape, or other magnetic, optical, or electronic storage medium and a network, wireline, wireless or other communication medium (column 1, lines 22-63), wherein the DPCM is an electronic storage medium transmitted the data through the PSTN (network).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

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CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 703-305-4097. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
April 14, 2005



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